

## CLAIMS

1. A file system, comprising:

a first collection object;

a second collection object;

5 a file object;

a first contract object, the first contract object including a first locator to locate the first collection object and a second locator to locate the file object; and

a second contract object, the second object including a third locator to locate the second collection object and a fourth locator to locate the file object.

10 2. A file system according to claim 1, wherein:

the first collection object includes a fifth locator to locate the first contract object;

the second collection object includes a sixth locator to locate the second contract object; and

15 the file object includes a seventh locator to locate the first contract object and an eighth locator to locate the second contract object.

3. A file system according to claim 2, further comprising means for using the fifth locator, the sixth locator, the seventh locator, and the eighth locator to traverse the file system.

25 4. A file system according to claim 1, further comprising means for using the first locator, the second locator, the third locator, and the fourth locator to traverse the file system.

5. A file system according to claim 1, wherein the first contract object includes a first rule associated with a first event that can occur to the file object.

30 6. A file system according to claim 5, wherein the second contract object further includes a second rule associated with a second event that can occur to the file object.

7. A file system according to claim 6, wherein the first event and the second event are the same event.

8. A file system according to claim 1, further comprising:

a second file object;

a third contract object, the third contract object including a fifth locator to locate the

5 first collection object and a sixth locator to locate the second file object; and

a fourth contract object, the fourth object including a seventh locator to locate the second collection object and a eighth locator to locate the second file object.

9. A contract object for use in a computer system, comprising:

10 a first locator to locate a file object in the computer system; and

a second locator to locate a collection object in the computer system;

where the contract object is part of a many-to-many relationship between a plurality of file objects in the computer system and a plurality of collection objects in the computer system, the file object being one of the plurality of file objects and the collection object being  
15 one of the plurality of collection objects.

10. A contract object according to claim 9, further comprising a metadata for the file object.

20 11. A contract object according to claim 9, wherein the first locator is a first identifier for the file object.

12. A contract object according to claim 9, wherein the first locator is a first pointer pointing to the file object.

25 13. A contract object according to claim 9, wherein the second locator is a first identifier for the collection object.

14. A contract object according to claim 9, wherein the second locator is a first  
30 pointer pointing to the collection object.

15. A contract object according to claim 9, further comprising a rule.

16. A contract object according to claim 15, wherein the rule is associated with an event that can occur to the first object.

17. A computer-implemented method for using a contract object, comprising:  
5 identifying a first object;  
identifying a second object;  
determining a relationship between the first object and the second object; and  
using the contract object to represent the relationship between the first object and the  
second object.

18. A computer-implemented method according to claim 17, wherein:  
identifying a first object includes identifying a plurality of first objects;  
determining a relationship includes determining a plurality of relationships between  
each of the first objects and the second object; and  
15 using the contract object includes using a plurality of contract objects to represent the  
plurality of relationships between the plurality of first objects and the second object.

19. A computer-implemented method according to claim 18, wherein each  
contract object represents the relationship between exactly one of the plurality of first objects  
20 and the second object.

20. A computer-implemented method according to claim 17, wherein:  
identifying a first object includes identifying a plurality of first objects;  
identifying a second object includes identifying a plurality of second objects;  
25 determining a relationship includes determining a plurality of relationships between  
the plurality of first objects and the plurality of second objects; and  
using the contract object includes using a plurality of contract objects to represent the  
plurality of relationships between the plurality of first objects and the plurality of second  
objects.

21. A computer-implemented method according to claim 20, wherein each  
contract object represents the relationship between exactly one of the plurality of first objects  
and exactly one of the plurality of second objects.

22. A computer-implemented method according to claim 17, wherein using the contract object includes:

storing a first locator for the first object in the contract object; and  
storing a second locator for the second object in the contract object.

23. A computer-implemented method according to claim 22, wherein:

storing a first locator includes:

assigning a first identifier to the first object; and

storing the first identifier in the contract object; and

storing a second locator includes:

assigning a second identifier to the second object; and

storing the second identifier in the contract object.

24. A computer-implemented method according to claim 17, further comprising storing a metadata for the first object in the contract object.

25. A computer-implemented method according to claim 17, further comprising associating a first rule with the contract object for a first event that can occur to the first object.

26. A computer-implemented method according to claim 25, further comprising associating a second rule with the contract object for a second event that can occur to the second object.

27. A computer-implemented method according to claim 17, wherein:

identifying a first object includes identifying a file object; and

identifying a second object includes identifying a collection object.

28. A computer-implemented method according to claim 17, further comprising:

storing a third locator for the contract object in the first object; and

storing a fourth locator for the contract object in the second object.

29. A computer-implemented method according to claim 17, further comprising assigning a third identifier to the contract object.

30. A computer-implemented method according to claim 29, further comprising:  
5 associating the third identifier of the contract object with the first object; and  
associating the third identifier of the contract object with the second object.

31. A computer-implemented method according to claim 17, further comprising  
10 recording an entry in a transaction log, the entry recording the use of the contract object.

32. A computer-implemented method according to claim 31, further comprising  
using the entry to reconstruct the contract object after the contract object is lost.

33. A computer-implemented method according to claim 31, further comprising  
15 removing the entry from the transaction log after the contract object represents the  
relationship between the first object and the second object.

34. A computer-implemented method for using a file system, comprising:  
identifying a first object in the file system;  
20 identifying at least one contract object associated with the first object;  
determining a second object using the contract object, the contract object defining a  
relationship between the first object and the second object; and  
using the second object.

35. A computer-implemented method according to claim 34, wherein:  
25 identifying a first object includes identifying a collection object in the file system; and  
determining a second object includes determining a file object using the contract  
object.

36. A computer-implemented method according to claim 35, wherein using the  
30 contract object includes traversing the file system from the collection object to the file object.

37. A computer-implemented method according to claim 34, wherein:

identifying a first object includes identifying a file object in the file system; and  
determining a second object includes determining a collection object using the  
contract object.

5           38.    A computer-implemented method according to claim 34, wherein using the  
second object includes:

receiving an event occurring with respect to the first object;

determining a rule associated with the contract object to be applied if the event  
occurs; and

10           applying the rule.

39.    A computer-implemented method according to claim 38, wherein determining  
a rule includes determining the rule associated with the contract object to be applied to the  
second object when the event occurs to the first object.

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40.    A computer-implemented method according to claim 38, wherein determining  
a rule includes determining the rule associated with the contract object to be applied to the  
contract object when the event occurs to the first object.

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41.    A computer-implemented method according to claim 34, wherein:

determining a second object includes determining a locator for the second object in  
the contract object; and

using the second object includes using the locator for the second object to access the  
second object.

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42.    A computer-implemented method according to claim 41, wherein:

determining a locator includes determining an identifier for the second object in the  
contract object; and

30           using the second object includes using the identifier for the second object to access  
the second object.

43.    A computer-implemented method according to claim 41, wherein:

determining a locator includes determining a name for the second object in the contract object; and

using the second object includes using the name for the second object to access the second object.

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44. Computer-readable media containing a program to use a contract object, the program comprising:

software to identify a first object;

software to identify a second object;

10 software to determine a relationship between the first object and the second object;

and

software to use the contract object to represent the relationship between the first object and the second object.

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45. Computer-readable media according to claim 44, wherein:

the software to identify a first object includes software to identify a plurality of first objects;

the software to identify a second object includes software to identify a plurality of second objects;

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the software to determine a relationship includes software to determine a plurality of relationships between the plurality of first objects and the plurality of second objects; and

the software to use the contract object includes software to use a plurality of contract objects to represent the plurality of relationships between the plurality of first objects and the plurality of second objects.

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46. Computer-readable media according to claim 45, wherein each contract object represents the relationship between exactly one of the plurality of first objects and exactly one of the plurality of second objects.

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47. Computer-readable media according to claim 44, further comprising software to associate a first rule with the contract object for a first event that can occur to the first object.

48. Computer-readable media according to claim 44, further comprising software to assign a third identifier to the contract object.

49. Computer-readable media according to claim 48, further comprising:  
software to associate the third identifier of the contract object with the first object; and  
software to associate the third identifier of the contract object with the second object.

50. Computer-readable media according to claim 44, further comprising software to record an entry in a transaction log, the entry recording the use of the contract object.

51. Computer-readable media according to claim 50, further comprising software to remove the entry from the transaction log after the contract object represents the relationship between the first object and the second object.

52. Computer-readable media containing a program to use a file system, comprising:  
software to identify a first object in the file system;  
software to identify at least one contract object associated with the first object;  
software to determine a second object using the contract object, the contract object defining a relationship between the first object and the second object; and  
software to use the second object.

53. Computer-readable media according to claim 52, wherein the software to use the second object includes:

software to receive an event occurring with respect to the first object;  
software to determine a rule associated with the contract object to be applied if the event occurs; and  
software to apply the rule.